SPA COVER SYSTEM

Field of the Invention

[01] The invention generally relates to a spa cover system that provides an improved moisture barrier and/or provides improved heat insulation.

Background of the Invention

[02] Spa covers are widely used to cover spas, or hot tubs, to protect the water within the spa tub from dirt and contamination and to provide a moisture and heat barrier, thus reducing the cost of operating the spa. Spa covers are various sizes and shapes, and are designed to rest upon the top edge of a spa tub. Spa covers are often made up of two connected, folding halves and a hinge provided on the top surface connecting the two halves. The hinge allows the spa cover to be folded.

[03] Spa covers generally include a core material and an outer cover material formed around the core material. The core material is typically made of a light, rigid insulating material. For example, molded, foamed styrene is a commonly used core material. The outer cover is typically made of fabric-reinforced vinyl. The outer cover provides a pleasing cosmetic appearance and creates an outer shell around the core material.

[04] Typically, the fabric-reinforced vinyl material provided at the bottom of the spa cover directly contacts the rim of the spa tub to provide a seal between the spa cover and the spa tub. This seal is meant to prevent the heat of the water within the spa tub from escaping.

[05] However, this spa cover arrangement often does not provide a sufficient seal.

[06] During typical operation, the temperature of the water within the spa tub is kept at a high temperature in order to allow persons to bath within the tub. However, since spas are often located outdoors and are designed to be used in all seasons, there is a large temperature

difference between the water and the outside air during cold weather. This temperature difference encourages a substantial heat transfer from the hot spa water to the cold outside air. Since the core of the spa cover is made of an insulating material, the main routes of heat escape is through the incomplete sealing between the lower fabric-reinforced vinyl material and the top rim of the spa and through gaps around the hinge where the two cover halves meet.

[07] The available options for providing an improved seal between the spa tubs and the spa cover are limited by the fact that different spa tubs have different tub rim shapes and patterns. In addition, the fact that tub rims often have cut out sections for control panels, rests, or other features also restricts the design options.

[08] Furthermore, if the spa tub is symmetrical shape, such as a square shape or a round shape, there is no preferred orientation for providing the cover on top of the tub. Since the spa cover could just as easily be provided at different orientations on the top of the tub, the problem of providing an improved seal between the spa cover and the tub is further complicated.

[09] Another deficiency with existing spa cover systems is that the outer cover material of the spa cover, which is typically fabric-reinforced vinyl material, does not prevent moisture from entering the spa cover core material. In addition, the outer cover can have zippers or similar fastening devices that do not provide a sufficient seal.

[10] As such, these covers allow water to be absorbed into the pore spaces of the insulating, core material (e.g., styrene foam) and, over time, accumulate in the core material much like water would accumulate within a sponge. This accumulated water is difficult to remove and causes the water laden spa cover to become extremely heavy.

[11] In an attempt to reduce the absorption of water from a heated spa, some spa covers have used a barrier layer of plastic film that is hermetically sealed around the entire

styrene foam core. This barrier layer is typically a single resin species film, such as low density polyethylene.

[12] While this approach does provide some protection, the moisture permeation rates through the barrier layer are still fairly substantial over the life of a cover. Thus, even with a typical plastic film, the core material will become progressively heavier with the absorption of moisture from the spa water.

[13] The present invention is directed to overcoming one or more of these problems set forth above.

Summary of the Invention

[14] It is, therefore, desirable to provide an improved heat barrier between the lip of the spa and the spa cover.

[15] According to a first aspect of the invention, a spa cover system includes a spa cover; and a resilient gasket provided at a bottom of the spa cover. Another spa cover system includes a spa tub having a tub rim; a spa cover; and a resilient gasket interposed between said spa tub and said spa cover, wherein said resilient gasket is provided one of: at a bottom of the spa cover; and at a top of the tub rim.

[16] In addition, it is desirable to provide a spa cover having a barrier that is able to provide an improved moisture barrier.

[17] According to a second aspect of the invention, a spa cover includes a core insulating material, and a cover material that surrounds the entire core insulating material. The cover material includes a plurality of laminated, diverse waterproof layers.

Brief Description of the Drawings

[18] The advantages, nature and various additional features of the invention will appear more fully upon consideration of the illustrative embodiment of the invention which is schematically set forth in the drawings, in which:

[19] FIG. 1 shows a spa cover and a spa tub;

[20] FIG. 2 shows a bottom view of a spa cover and a resilient gasket provided on the bottom of the spa cover;

[21] FIG. 3 is a 3-3 sectional view of the spa cover and gasket of FIG. 2;

[22] FIG. 4 is a sectional view of a gasket provided in a deformed manner between the spa cover and rim of the spa tub;

[23] FIG. 5 is a 5-5 sectional view of the spa cover and gasket of FIG. 2;

[24] FIG. 6 shows a spa tub having a resilient gasket;

[25] FIG. 7 shows a spa cover including a multi-layer laminated cover material and a core insulating material; and

[26] FIG. 8. shows the multi-layer laminated spa cover material of Fig. 7.

Detailed Description of the Drawings

[27] While the invention is open to various modifications and alternative forms, specific embodiments thereof are shown by way of examples in the drawings and are described herein in detail. There is no intent to limit the invention to the particular forms disclosed.

[28] FIG. 1 shows a first non-limiting embodiment of the first aspect of the invention in which spa cover is provided on a spa tub 50.

[29] A deformable gasket 20 (shown in FIG. 2) provides an improved seal between the spa cover 10 and a rim 60 of the spa tub 50. The spa cover 10 includes a first cover portion 12

and a second cover portion 14 and a hinge 16 provided on the top surface 10a of the spa cover 10. The hinge 16 connects the two portions 12, 14 and allows the spa cover 10 to be folded.

[30] As shown in FIG. 2, the deformable gasket 20 is applied to a lower surface 10b of the spa cover 10 as a continuous "U" shape on each portion 12, 14 of the cover 10. It is preferred that the gasket is adhesively bonded to the lower surface 10b of the spa cover 10. For example, a water-resistant acrylic adhesive can be used to fix the gasket 20 into place. However, the invention is not limited in this respect. For example, the gasket 20 can be mechanically attached using staples or the like, or can be bonded.

[31] FIG. 3 is a 3-3 cross section of the gasket and spa cover of FIG. 2 showing the first and second cover portions 12, 14 and the hinge 16. Parts 22, 24 of the gasket 20 are applied to the inner edges 12a, 14a of the spa cover portions 12, 14 so that the parts 22, 24 extend into a space 30 between the spa cover portions 12, 14. These parts 22, 24 provide a seal that is in addition to that of the main part of the gasket 20 when the two portions 12, 14 of the spa cover are lowered onto the rim 60 of the spa tub 50.

[32] In addition, a small hanging sealing flap 18 is used to provide some closure between the two inner edges 12a, 14a of the spa covers 12, 14. In typical spa covers, however, there is a large gap at the distal end 18a at the bottom of the sealing flap 18. As such, it is preferred that a flap gasket portion 26 is provided on the distal end 18a of the flap 18 in order to complete the seal between the spa cover 10 and spa tub 50. This flap gasket portion 26 is preferably made of the same material as the gasket 20 provided on the bottom of the spa cover 10.

[33] FIG. 4 shows the gasket 20 is sealing contact with the rim 60 of the spa tub 50. The fact that the gasket 20 is made of a resilient, deformable material allows the gasket to conform to the different shapes of spa tubs 50, and therefore mate with tubs having a variety of

different geometries or shapes. This provides an improved insulation barrier between the spa tub 50 and cover 10.

[34] The cross sectional shape of the gasket 20 can have different forms. Preferably, the cross-sectional shape is as shown in FIG. 5. The inner edge 20a is slightly thicker than the outer edge 20b, the outer edge 20b being the edge positioned closer to the outside wall 50a of the tub 50. This shape provides an improved seal between the spa cover 10 and rim 60 of the spa tub 50 because, when the cover 10 is lowered onto the spa tub 50, the gasket 20 is displaced outward allowing it to block gaps between the spa cover 10 and spa tub 50 that are located exterior to the outer edge 20b. Alternatively, the gasket can have a curved symmetric shape, a rectangular shape, etc.

[35] The gasket material can be made of a rubber, such as a foam rubber. If foam rubber is used it can be either an open cell foam or a closed cell foam (e.g., neoprene polyurethane, polyethylene, or a deformable PVC). However, the invention is not limited in this respect, and the gasket can be made of a different resilient material.

[36] It is preferred, however, that the resilient material has a high rate of recovery from a deformed state to a restored state, and that the gasket material is made of a high density material that is able to support the weight of the cover spa cover 10. Furthermore, the gasket material should also be able to resist chemicals that are typically used in spa water, such a chlorine.

[37] The size of the gasket 20 depends on the size of the tub. A typical range of gasket widths W is from about 2 to 3 inches, and a typical range of gasket thicknesses T is between ½ to 1 inch. However, the invention is not limited in this respect.

[38] In addition, it is preferable that the gasket is entirely solid, i.e., that there is no hollow space within the gasket. It is noted that the small cells within a celled foam gasket material are not considered hollow spaces. Instead a hollow space is a space between opposing interior surfaces of the gasket material. Again, however, the invention is not limited in this respect.

[39] Although the fact that the gasket material is entirely solid does slow down the ability of the gasket to conform to the shape of a spa tub rim and to recover an original shape somewhat, a solid gasket provides a better seal between the cover and spa than a gasket with a hollow space. This is because a solid gasket will deform in a manner that follows the curvature of an odd shaped spa tub rim more precisely than a gasket with a hollow space. Furthermore, the fact that the gasket is solid prevents moisture from collecting within a hollow space.

[40] In addition, the first aspect of the invention is not limited to a foldable, hinged spa cover, but can apply equally well to a one-piece cover or a two-piece cover without a hinge. With a one piece cover, or two-piece cover without a hinge, there is no need for the gasket to be provided at the hinge location, but instead the gasket need only be provided on the bottom of the spa cover where the cover mates with the rim of the spa tub.

[41] In addition, FIG. 6 shows a second non-limiting embodiment of the invention. According to this embodiment, the gasket 20' is provided on the top surface 60a of the tub rim 60 instead of the lower surface 10b of the cover 10.

[42] Although the invention is not limited in this respect, the gasket 20' can be adhesively bonded or mechanically attached to the tub rim 60. For example, the gasket 20' can be positioned and adhesively bonded within a groove 62 provided on the top surface 60a of the tub rim 60 to so that a portion of the gasket 20' extends from the groove 62.

[43] FIG. 7 shows a non-limiting embodiment of the second aspect of the invention. According to a second aspect of the invention, a multi-layer, waterproof outer cover material 110 is hermetically sealed surround the entire core material 120 of a spa cover 100. This multi-layer, waterproof cover material 110 protects the core material 120 of the spa cover 100 from moisture penetration and absorption. As discussed above in the Background Section, the core material 120 is typically an insulating material, such as a foamed styrene, which can become waterlogged.

[44] As shown in Fig. 8, the multi-layer waterproof, cover material 110 consists of multiple, diverse thin waterproof layers 110a, 110b, 110c. The diverse layers can be, for example, layers of different materials and/or layers of the same material that are laminated at different orientations with respect to each other. These layers 110a, 110b, and 110c are each preferably a plastic material.

[45] The use of layers of different materials provides a superior moisture barrier without the thickness or weight that would be necessary if a single material was used. By laminating the thin layers together, a superior moisture barrier is formed due to the synergistic effect of the physical and molecular properties. Typical improvement in moisture penetration rates are on the order of 100 times lower than single species resins such as polyethylene. Just as plywood becomes much stronger than the individual layers, a multi-layer barrier film, or co-extruded material, provides a far lower moisture permeation rate, and protects the core material over a longer period of time, compared with a single waterproof material.

[46] Some non-limiting examples of extremely thin multi-layer resins that include different materials are PVDC resins commercially marketed as SARANEX. These resins are extremely thin, about 1 to 5 mils thick. However, the invention is not limited in this respect and

other multi-layer films can be used, such as a laminated barrier including a polyethylene film sandwiched between SARANEX films.

[47] Although the food industry utilizes thin, lightweight multi-layer laminated barrier films, such as SARANEX, in order to protect foodstuffs, a multi-layered barrier film has not been utilized in the spa industry.

[48] This aspect of the invention is not limited to a multi-layer moisture barrier made up of different resins. For example, a barrier including layers of the same material laminated at different orientations can also be used to provide the enhanced moisture protection, such as a multi-layer film in which two layers are oriented at an angle of 90 degrees with respect to each other.

[49] It is of course understood that departures can be made from the preferred embodiments of the invention by those of ordinary skill in the art without departing from the spirit and scope of the invention that is limited only by the following claims. For example, although the first and second aspects of the invention are discussed separately for the sake of clarity, they can be used together to provide a spa cover with both an improved heat insulation and an improved moisture barrier.